

REMARKS

The Office Action of May 9, 2005, has been reviewed by the Applicants. Claims 2 and 4 have been amended and new claims 5-6 have been added. Claims 1-6 are pending. Applicants request reconsideration of the application.

A. Sequence identifiers have been added.

The Examiner stated that the application failed to comply with the requirements of 37 CFR 1.821 through 1.825 and identified several sequences in the specification where sequence identifiers had not been given.

Sequence identifier numbers 4-15 have been added to the sequences identified by the Examiner.

Because the prior paper copy and computer-readable copy did not contain SEQ ID Nos. 4-15, Applicants submit amended substitute sheets and 2 computer-readable copies of the Sequence Listing as required in 37 CFR 1.825(a). Basis for the amendments can be found in the specification in the paragraphs identified by the Examiner. The disks have been labeled per 37 CFR 1.824(a)(6). As required by 37 CFR 1.825(a), Applicants state that the substitute sheets and the replacement computer-readable copies include no new matter. As required by 37 CFR 1.825(b), Applicants also state that the copy in computer-readable form is the same as the substitute copy of the Sequence Listing. Applicants believe all requirements of 37 CFR 1.821 through 1.825 have been met.

B. The objections have been remedied.

Claim 2 was objected to because of the recitation "The A". The "A" has been removed.

Claims 2 and 4 were objected to under 37 CFR 1.75(c) as failing to limit the subject matter of a previous claim. Claims 2 and 4 have been amended to recite that the plant polynucleotide reduces at least one of the leaf length and the leaf width; a protein would not inherently control the leaf shape in this manner. Claims 2 and 4 are therefore in proper dependent form.

Applicants request withdrawal of the objections.

C. The claims are enabled.

Claims 1-4 were rejected under 35 U.S.C. 112, ¶ 1, as failing to comply with the written description requirement. Applicants traverse the rejections.

The Examiner stated that the specification “fails to provide guidance for how to use” SEQ ID Nos: 1 and 2 (emphasis added). Applicants reply under the belief that the Examiner questions whether the specification teaches how to use the claimed invention (as opposed to how to *make* the invention). MPEP § 2164.

Applicants submit that one skilled in the art would know how to use the claimed polynucleotides in view of the filed specification and the common knowledge of the art as of the priority date. Specifically, it was common knowledge how to use an aberrant polynucleotide to control leaf shape in plants, such as the use of transposons or vectors to disrupt the gene. Furthermore, recent published work (Miyao et al., *The Plant Cell* (2003), 15:1771-1780) has demonstrated that using transposons for gene disruption is beneficial in terms of functional analysis, as Tos17 specifically targets genic regions for integration.

Because the specification clearly demonstrates the functionality of the claimed polynucleotides in rice, one skilled in the art could predict and readily apply such polynucleotides to other plants. For example, the specification describes the amino acid sequence of SEQ ID NO: 1 as having very high homology with a gene in *Arabidopsis thaliana*; see page 15, lines 24-26.

It was well known as of the priority date that rice has homologs in other plants. For example, 58% of annotated proteins in rice have homologs in Arabidopsis (Liu et al., *Genome Research* (2001) 11:2020-2026). 98% of known maize, wheat, and barley proteins are also found in rice (Goff et al., *Science* (2002) 296:92-100). Other US patents filed prior to the priority date of this application also disclose such homologs. For example, US Patent 6,642,435, filed 12/17/1999, describes homologs between corn, rice, soybean, and wheat. US Patent 6,579,716, filed 9/28/1999, describes homologs between peas, Arabidopsis, spinach, and rice. US Patent 6,555,732, filed 9/8/1999, describes maize, soybean, sunflower, sorghum, canola, wheat, alfalfa, cotton, rice, barley, and millet as being homologous.

The Examiner cites two references for the proposition that a plant in which a gene controlling leaf shape is altered has an unpredictable phenotype. However, even Schneeberger and Harevan show knowledge of how to use the claimed polynucleotides as of the priority date and therefore enablement of the invention. Schneeberger shows what happens in maize plants when the *rough sheath2* gene is disrupted and extrapolates that to other plants in which other homeodomain proteins are ectopically expressed. Harevan teaches that all simple leaves are determined by the same developmental program and that the gene systems that condition them are conserved among species having simple leaves; see the last paragraph on page 741, right column. Each reference then predicts that the phenotype of a disrupted plant would change. In other words, both references show that if one skilled in the art knows what disrupting one gene does in one plant, s/he can reasonably predict what it would do in other plants.

Alternatively, the consequences of changing leaf shape with the *Knotted-1* gene or the *rough sheath2* gene cannot be extrapolated to predict the effects, if any, of using the claimed polynucleotides. As Harevan states in the last paragraph of page 741, right column, misexpression of *Knotted-1* in maize, rice, tobacco, and *Arabidopsis* has markedly different effects from that in tomato. Schneeberger merely discloses disrupting the *rough sheath2* gene. In other words, their teachings do not apply to the polynucleotide of SEQ ID NO: 1 or the polynucleotide encoding the polypeptide of SEQ ID NO: 2.

The Examiner states that undue trial and error experimentation would be required to determine what, if any effect, the transformation of a plant with the claimed sequences would have and how to use such plants. She lists the claim breadth, unpredictability of the art, and lack of guidance in the specification for this finding. As stated above, the claim breadth is supported by the common knowledge of one skilled in the art as of the priority date. With regards to unpredictability, Applicants have shown how in rice, a plant meeting all claim limitations, use of the claimed polynucleotides results in a changed leaf shape. Applicants also submit that one of skill would know how to use the polynucleotides of the invention (which is not the plant). Finally, the specification provides guidance for one of skill in the art to use the claimed

polynucleotides by showing their use in rice. Applicants note that MPEP § 2164.08, quoting *In re Buchner*, states, “[N]ot everything necessary to practice the invention need be disclosed. In fact, what is well-known is best omitted.”

With regard to the Examiner’s statement that the specification does not describe the transformation of any plant, the written description guidelines listed in the Federal Register, Vol. 66, No. 4, January 5, 2001, pp. 1099-1111 (the “Guidelines”) do not require such a description. The Guidelines, on page 1106, right column, state:

[T]here may be situations where one species adequately supports a genus... Description of a representative number of species does not require the description to be of such specificity that it would provide individual support for each species that the genus embraces. (emphasis added)

In addition, please note the response to Comment 9 in the Guidelines, page 1101: “there is no basis for a per se rule requiring disclosure of complete DNA sequences or limiting DNA claims to only the sequence disclosed.” By analogy, there is no requirement that the specification describe the transformation of every plant which falls under the claim breadth; the transformation of one plant may adequately support the claim breadth.

For the reasons given above, Applicants submit that the requirements of 35 U.S.C. 112, ¶ 1 are met and request withdrawal of the rejections.

D. Other items are addressed.

Applicants acknowledge the Examiner’s finding that SEQ ID NO: 2 is free of the prior art.

Applicants have also submitted new claims 5 and 6. Support for these claims is found throughout the specification. Applicants note that the new claims are narrower than claim 1 or 2.

CONCLUSION

For the reasons given above, Applicants submit that all pending claims (1-6) are in condition for allowance. Withdrawal of the rejections and issuance of a Notice of Allowance are requested.

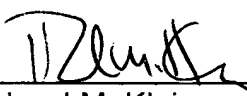
In the event the Examiner considers personal contact advantageous to the disposition of this case, she is hereby authorized to call Richard M. Klein, at telephone number 216-861-5582, Cleveland, OH.

It believed that no fee is due in conjunction with this response.

Respectfully submitted,

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CERTIFICATE OF MAILING

Under 37 C.F.R. § 1.8, I certify that this Amendment is being

- ☒ deposited with the United States Postal Service as First Class mail, addressed to: MAIL STOP AMENDMENT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.
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